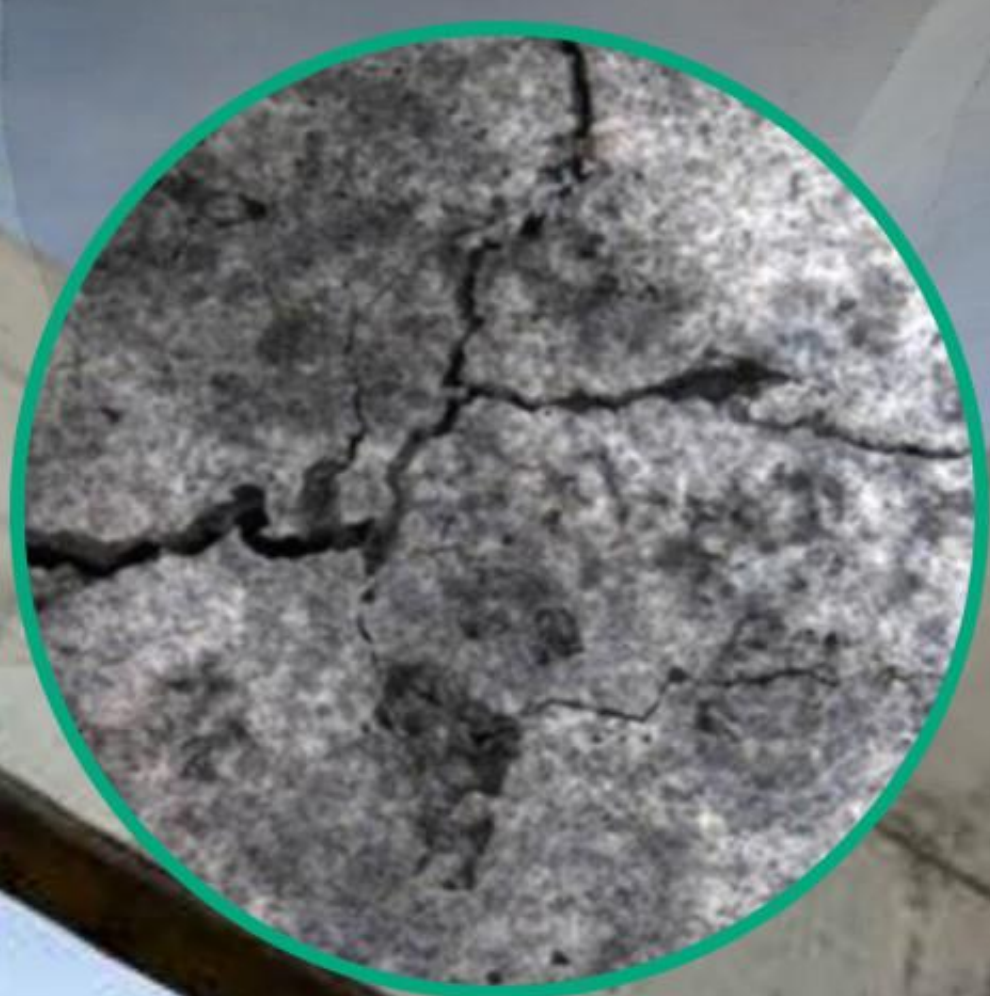


Basilisk SA self healing concrete



We add value to concrete

Before



After



 **TU Delft**

it's **magic**

Self Healing Agent for Concrete Mixtures



An extinguishing water tank of the Port of Rotterdam Authority is provided with special concrete walls. By the addition of bacteria to the concrete they are self-healing.



Basilisk Self Healing Agent for Concrete Mixtures



BASALISK CONCRETE SELF HEALING AGENT

Since Roman times men build constructions using concrete as an all-round building material. While ordinary concrete can handle substantial compressive loads, tensile and flexural load carrying capacity is however limited. Even when reinforced with steel rebars, concrete is sensitive to crack formation. Cracking can result in a number of problems such as water leakage, frost damage and reinforcement corrosion. These detrimental phenomena shorten the functional service lifetime of concrete constructions substantially and require therefore costly maintenance and repair actions. For difficult to reach constructions manual inspection and repair is however often not possible or otherwise even more expensive. A solution to avoid costly maintenance and repair actions is provided by self-healing concrete. In 2010 the Delft University of Technology invented self-healing concrete: concrete of the future. After founding the company Green-Basilisk in 2014, self-healing concrete became available for the market. From now on concrete is able to self-repair cracks, making constructions more durable thereby increasing its service lifetime while reducing maintenance and repair costs. Basilisk Self Healing Concrete is a true innovation as its patented bio-based technology is recognized by the European Patent Office by nominating it for the 2015 European Inventor Award. In short,

Basilisk Self Healing Concrete will make constructions last longer, while at the same time reducing costly maintenance and repair. The choice for owners who consider construction life cycle costs.

Characteristics

Basilisk Self Healing Agent is applied in special repair mortars and concrete mixtures. It is composed of a biodegradable granular additive (healing agent) what autonomously seals and waterproofs up to 1-mm wide occurring cracks. Permanent sealing occurs due to concrete compatible limestone formation. Compatible with commercial concrete mixtures. Contains a biodegradable polymeric mineral precursor compound and a bio-based enzymatic catalyst.

Typical applications

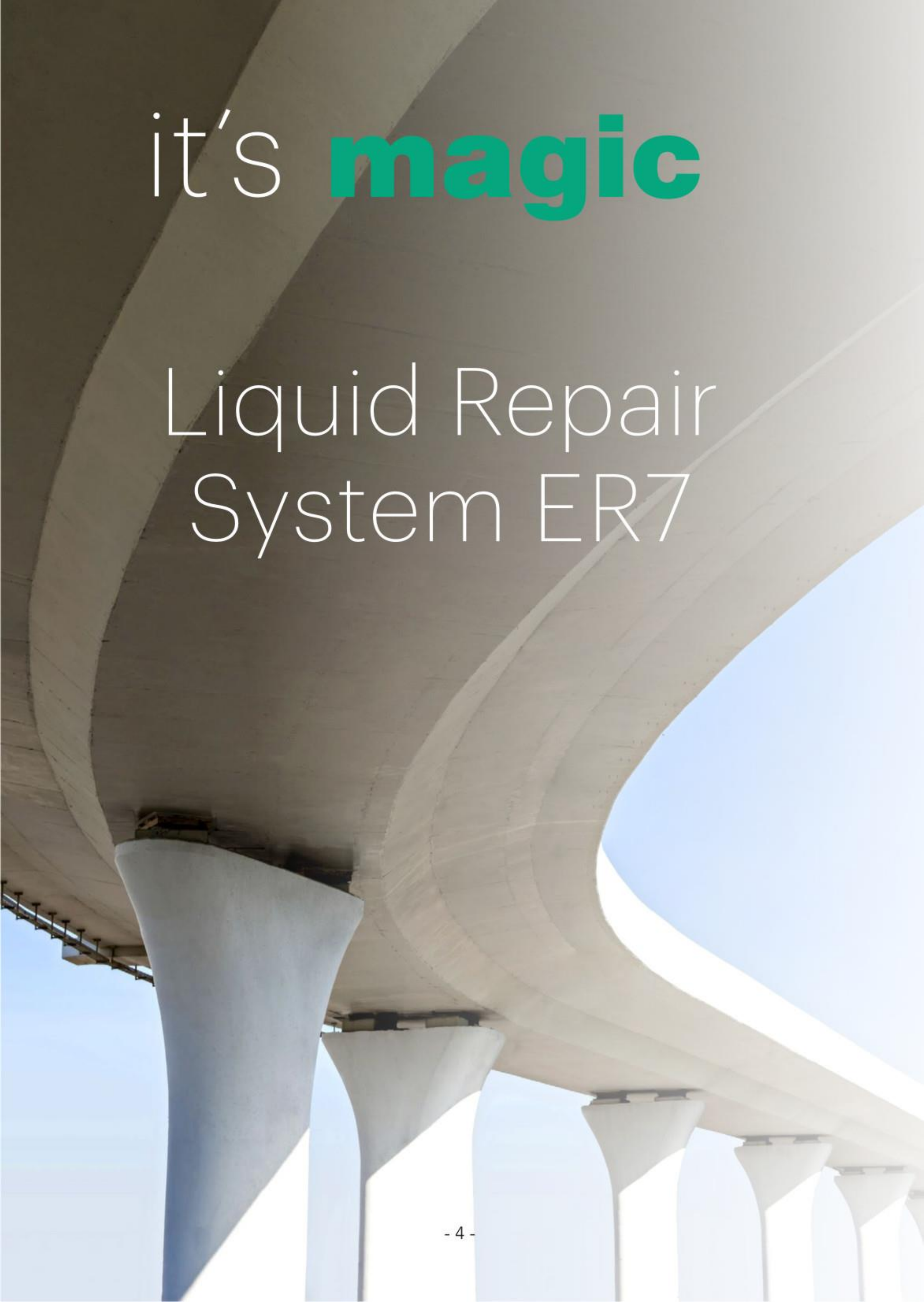
- Tunnel elements
- Liquid-containing reservoirs
- Basement walls
- Subsurface constructions
- Marine constructions
- Bridge- and parking decks
- Flooring systems

Tailor made solutions

One of our Basilisk technical specialist will support your company to design your concrete self-healing mix. It is tailor made special for your project. In general between 5 and 15kg healing agent per m³ concrete mix is required, depending on environmental conditions of application. Healing Agent can be applied in ready mixes, prefab applications, or added directly to the truck mixer on site.

Health and environmental aspects Safety

Non-flammable / non-explosive



it's **magic**

Liquid Repair
System ER7



Basilisk Liquid Repair System ER7



Basilisk Repair System ER7 is a 2-component low viscosity color- and virtually odorless organic solvent-free solution. It contains natural enzymes, organic- and inorganic salts and is specifically developed for permanent sealing and waterproofing of cracks (up to 0.8mm wide) in concrete constructions. The 1st component penetrates deep into cracks and pores, while application of the 2nd component results in gel formation sealing cracks and pores, and furthermore contributes to curing of the concrete surface. Both components of Basilisk Repair System ER7 are delivered in form of powder mixtures which must be dissolved in lukewarm water immediately before application.

Advantages in Application

- Organic solvent free • Colorless • Permanently seals cracks up to 0.2mm (1 treatment) up to 0.8mm width (2-3 treatments) • Densifies porous surfaces • Penetrates deep into cracks and pores • Prevents chloride attack and delays reinforcement corrosion • Increases frost damage resistance • Rapid application allowing fast accessibility of construction

Application areas

Particularly suitable for repair of concrete constructions suffering from drying- and shrinkage cracking and wear. Can be applied on porous surfaces or directly into cracks. Type, position, amount, and size of cracks must be inspected and established by expert concrete repair personnel prior to repair in order to ensure proper and functional application of Basilisk ER7. Understanding of cause of crack formation, early wear, possible reoccurrence and its consequences for functional performance and durability aspects of concrete constructions requires inspection by trained workers.

Application

Inspection of application area by a Basilisk certified concrete repair technologists is required prior to application of Basilisk Liquid Repair System ER7. Powder mixtures of both components must be dissolved separately in specified aliquots of lukewarm water directly before application.

Both liquid solutions must be transferred separately in (handheld) pressurized spray units. The first component 'A' must be applied in amounts sufficient to saturate occurring cracks and pores, while the second component 'B' must be applied sequentially (within 5 to 30 minutes after application of component 'A'). Application of component 'B' results in formation of a firm gel, covering and sealing cracks and pores, as soon as brought into contact with component 'A'. Cracks and pores of to be treated concrete surfaces must be clean and dry prior to treatment to allow effective penetration of the liquid repair system. Typical application volume of component 'A' is 0.5L / m² and application ratio of component 'A' to 'B' is 4:1 but both may vary depending on present crack- and pore number and volume. Permanent sealing of pores and cracks up to 0.2mm cracks requires a single treatment while larger cracks (up to 0.8mm wide) requires 2 to 3 sequential treatments interrupted by minimally 6 weeks periods. Used spray units must directly after use be emptied and thoroughly rinsed with lukewarm water to allow re-use of sprayers.

Waste disposal

Excess and left over aliquots of both component 'A' and 'B' solutions can be mixed (beware of gel formation) prior to discarding. Waste must be labelled as 'alkaline- organic salt-containing, organic solvent free, waterbased solution' and discarded according to national waste treatment regulations.

Storage conditions

Containers holding mixed powders of both component 'A' and 'B': between 0°C and + 40°C. Containers must be sealed and protected against moisture. Shelf life of sealed containers: 12 months Penetration depth solution 'A': Class II ≥ 10 mm

Water absorption: Reaction time: Ca. 3 weeks (depending on In Situ temperature)

Product characteristics

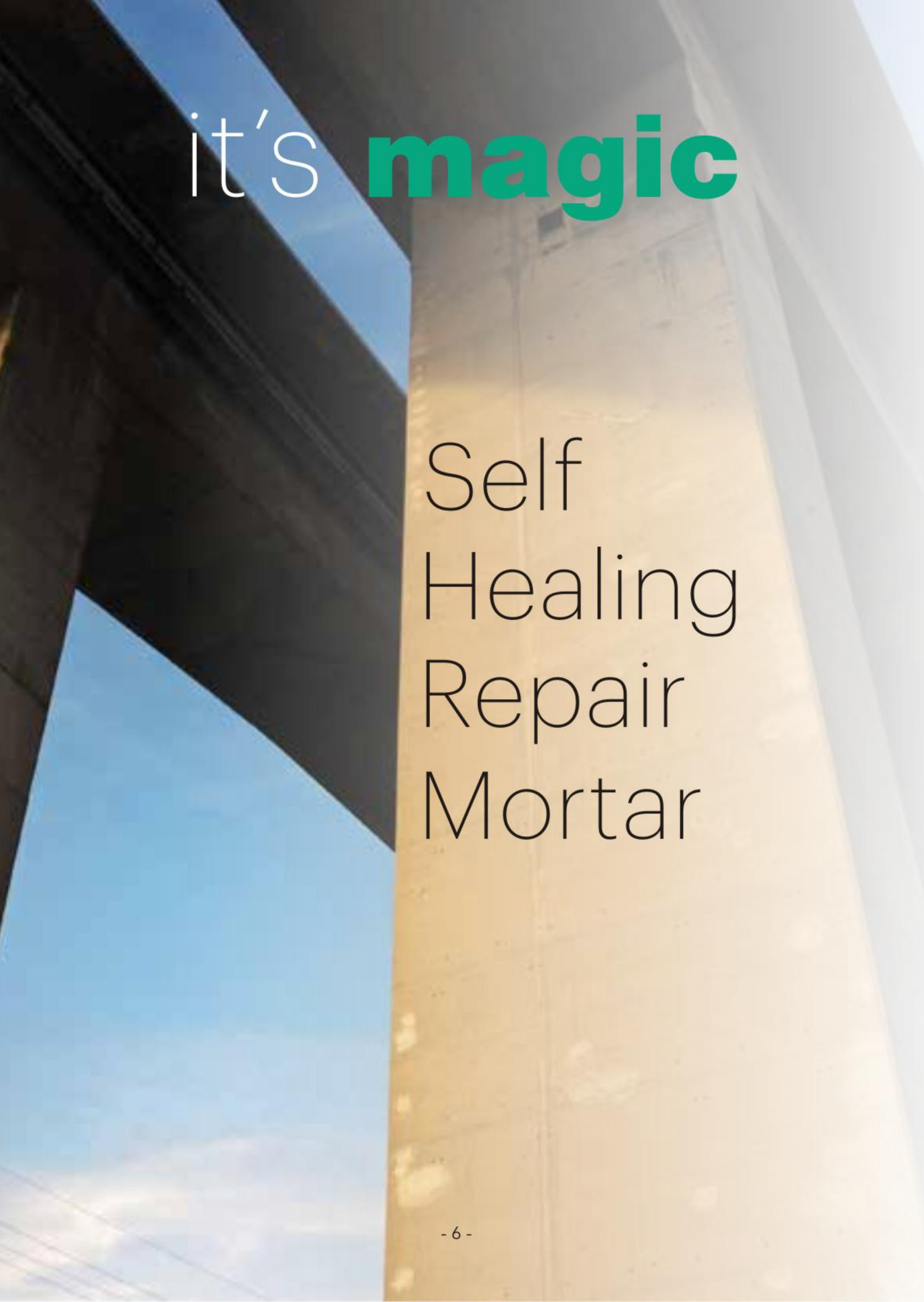
Description: Powder mixtures components 'A' and 'B' • Low viscosity, colorless liquid solution, organic solvent-free • Solid powder content after dissolution: 0-2"%" • Odour: mild yeast extract • Volume - weight ratio (kg/l) : 1,1 • Boiling point solutions 'A' and 'B': 100°C • Freezing point solutions 'A' and 'B': 0°C • Flashpoint: non-flammable • Storage conditions: Between 0°C and + 40°C • Viscosity solution 'A': 1,1 mPa.s • Viscosity solution 'B': 1,1 mPa.s • Viscosity after mixing solutions 'A' and 'B': Increasing to ca. 1000 mPa.s • Shelf life powders mixtures in sealed containers: 12 months

Packaging

Available in sealed containers: Powder mixture component 'A': 0.9kg and 9kg for respectively 5L and 50L solutions
Powder mixture component 'B': 1.25kg and 12.5kg for respectively 2.5L and 25L solutions

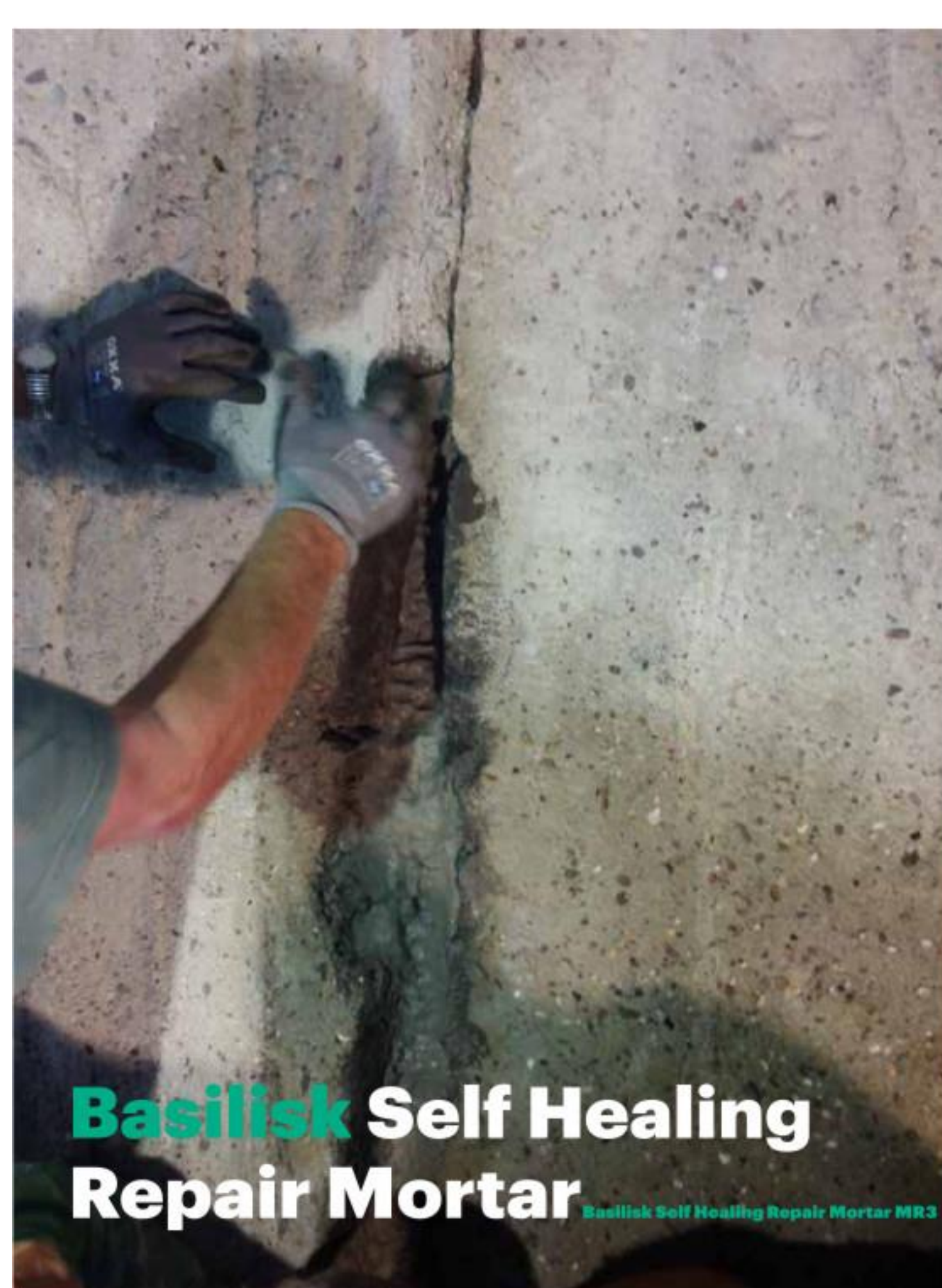
Health and environmental aspects:

- R 38 – Irritating for bare skin
- S 24 – Avoid direct skin contact
- Safety: non-flammable / non-explosive



it's **magic**

Self
Healing
Repair
Mortar



Basilisk Self Healing Repair Mortar

Basilisk Self Healing Repair Mortar MR3



Basilisk Self Healing Repair Mortar MR3

Cracks in concrete, specifically below ground water level, can be detrimental to water tightness of constructions and can therefore result in leakage problems. For structural and durable repair of such cracks Basilisk Self Healing Repair Mortar MR3 has been developed. MR3 is a 1-component repair mortar modified with Basilisk Healing Agent.

It contains natural enzymes and is specially developed for waterproofing leakage spots in concrete. After applying the mortar the Healing Agent will start to react within 24 hours resulting in permanent waterproofing of the construction. This mortar is particularly suitable for permanent and durable repair of larger than 1mm wide cracks and porous leaky parts of concrete constructions.

Basilisk Repair Mortar can be typically applied to:

- Stop water leakage in basement walls
- Permanently repair water-leaking cracks
- Provide ductile dilatations under dynamic loading conditions
- Repair of structural defects

Characteristics

Based on biodegradable granular additive (Basilisk Healing Agent)
Contains strain hardening PVA fibers providing:

- Low shrinkage
- Strong bonding
- Ductile behaviour

Composition

- Portland cement
- Limestone powder
- Fly ash
- PVA fibres
- Plasticizer
- Biodegradable polymeric mineral precursor compound
- Bio-based enzymatic catalyst

Storage conditions

Dry, between 10 and 40°C

Packaging

Basilisk Self Healing Repair Mortar is available as ready mix in 20kg bags

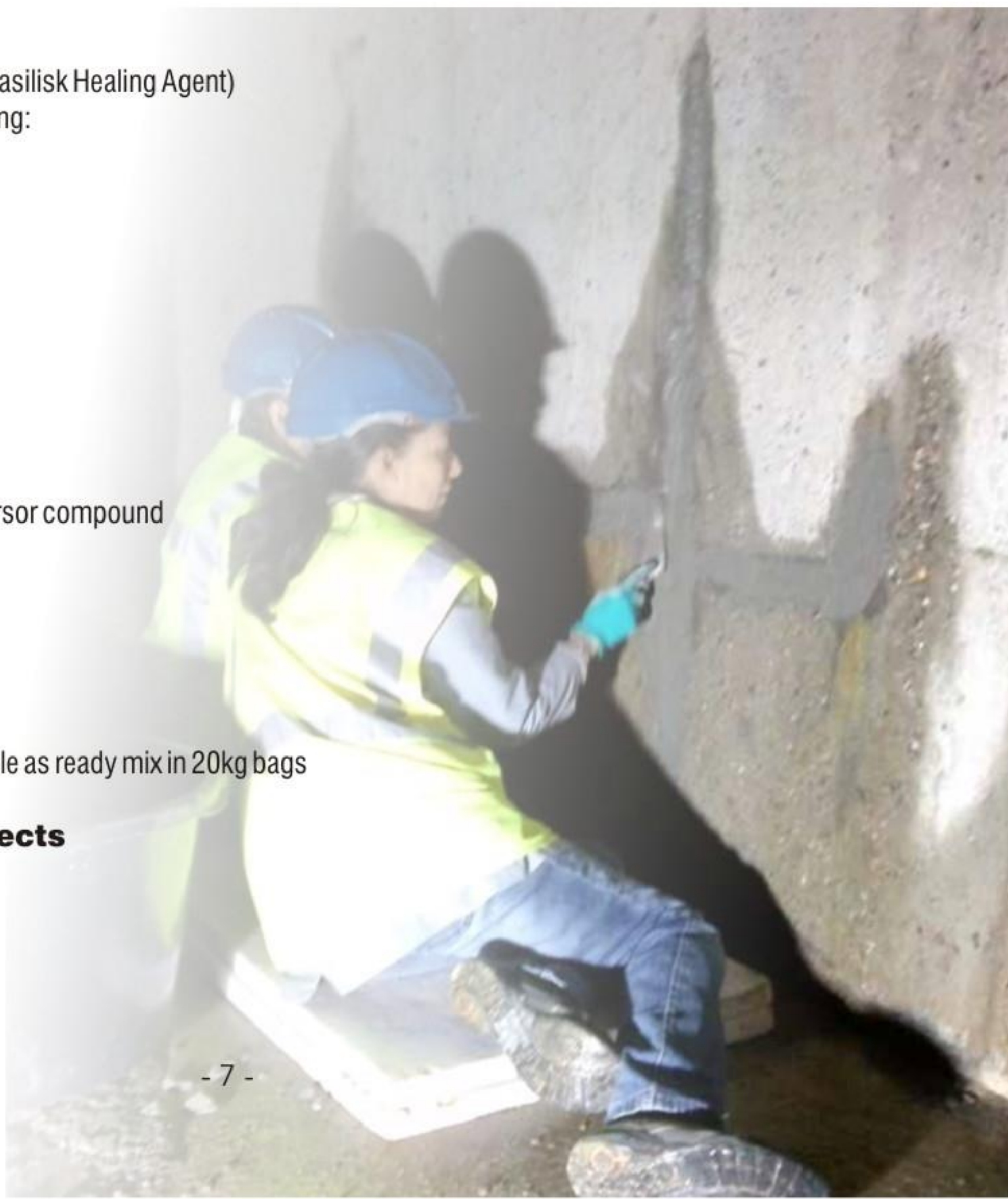
Health and environmental aspects

R 38 - Irritating for bare skin

S 24 - Avoid direct skin contact

Safety

Non-flammable / non-explosive





1

**Problem:
Crack formation**



2

**Accommodation
of bacteria and
nutrients**



3

**Presents of water,
oxygen and alkaline
environment**



4

**Multiplication of
bacteria**



5

**Formation of
Limestone**



6

**Autonomously
repaired cracks**

Cracking is a common phenomenon in concrete structures resulting in leakage problems. The cracks will greatly influence the safety and the durability of the structure.

Specially selected bacteria and nutrients are accommodated in the cracks to facilitate the autonomous repair system. The technique and time of adding the bacteria depends on the used product.

When in contact with water and oxygen, which will be present due to the cracks, the bacteria are triggered. The bacteria need a certain alkalinity which is either provided by the concrete itself or by the product.

When in presents of water, oxygen and nutrients the bacteria will start to multiply. This will insure a wide dispersion of bacteria inside the entire crack.

The widely dispersed bacteria will start to produce calcium carbonate (limestone) which will eventually seal the crack.

Due to the formation of limestone the crack is autonomously repaired increasing the durability of the concrete structure.

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